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TRANSLATIONS ON EASTERN EUROPE
SCIENTIFIC AFFAIRS

No. 530



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INTERNATIONAL AFFAIRS

DEVELOPMENTS IN CHEMICAL INDUSTRIES OF SOCIALIST COUNTRIES

Bucharest REVISTA DE CHIMIE in Romanian Aug 76 pp 732-734, Sep 76 pp 820-822

[Excerpts from survey]

[Excerpts] USSR

The Lokand (Uzbekistan, USSR) Combine has put in operation a department to produce a substance which lengthens the lifetime of tires. The preparation is extracted from cotton seeds, and is used in the manufacture of tires at the rubber formulation stage. Specialists have stated that this product doubles the wear of automobile tires and increases considerably their resistance to cold. Experiments conducted above the Arctic Polar Circle have given positive results. Specialists at the Tire Research Institute of Leningrad have finalized the original technology for the production of these tires.

Soviet chemists have produced a reagent called Azerbaidjan-4, which is used to protect the sea and rivers from waste water pollution. The product eliminates not only water wastes, but calcium and magnesium salts as well, thereby assuming anti-corrosion properties. Sea and mineral water treated with this reagent can be used in electric plant boilers and for other technologic purposes. The reagent will make it possible to save large quantities of drinking water in industry. The production of the reagent costs less than the application of other methods.

Two installations are currently being built at Baku to purify waste water and water deposits using the new method. Economists have calculated that in the Azerbaidjan oil industry alone, millions of rubles of investment will be saved, money which would have been necessary to build other installations according to another design.

Chinese People's Republic

In recent years, researchers and technicians in the Chinese People's Republic have perfected and expanded new modern technologies in the oil processing and chemical industries. As a result, they have achieved outstanding progress. At the Lanchow Petrochemical Combine, for instance, as a result of a rational utilization of raw materials, more than one half of the synthetic ammonia is produced without the use of coal. At this same combine, a petrochemical installation has been built, which uses turbocompressors for cracking gases, ethylene, and propylene. Between 1965 and today, the Lanchow refinery has completed more than 11,000 new scientific research projects devoted to important technological problems. Among other things, new types of catalysts and additives have been introduced in production.

East Germany

In 1975, East Germany began producing in Weissenborn a cellulose powder called Geweten, whose qualities make it applicable in the food and pharmaceutical industry. The addition of this cellulose powder to drugs insures the rapid dissolution of pills in the digestive tract, and hastens the absorption of the drug. In foods, part of the fats and carbohydrates are replaced with Gweten to result in dietetic products with fewer calories.

In 1975, about 30 percent of East Germany's national investments were allocated to the chemical industry. The production of this sector increased by 45-50 percent with respect to 1970. A considerable growth was recorded in plastic materials and synthetic fibers. Some of the projects which are being completed in the petrochemical sector are: an ethylene production unit is being built at Bohlen and is expected to be started in 1976; a complex for plastic materials and caustic soda is being built at SCH Skopland and is expected to begin operations in 1979; and the production of synthetic rubber will be expanded at the Chemiewerk Greiz Dolan plant.

Hungary

During the last quarter century, Hungary's production of pharmaceuticals has increased 100-fold. The largest portion -- 70 percent -- is intended for exports, half of which will be to socialist countries. Among the drug plants, the largest development has been recorded for the the plant in the Kobanya area of Budapest, which provides one third of the total production of this industrial branch. It is notable that more than one half of this plant's production is based on its own research.

Specialists at the Research Institute for Petroleum and Gases have formulated a process for exploiting the oil obtained as a by-product in the pyrolysis of gasoline. Although processed in smaller amounts than ethylene and butylene, its exploitation is important when one considers that it has been used as fuel. Using this process, it is possible to obtain valuable aromatic compounds such as methylic naphthalene, diphenyl and phenanthrene, and heavy resins.

At the Borsod plant of Kazincbarcika, a large factory for organic-synthesis chemical products will be put in operation between 1976-1978. The equipment of this factory will be obtained from American and Japanese companies. This new Hungarian chemical unit will annually transform 80,000 tons of ethylene into 150,000 tons of polyvinyl chloride for construction materials, parts for the furniture industry, cable products, and synthetic leather. Part of the polyvinyl chloride will be exported. The plastic materials industry in Hungary will also be expanded through the construction, at Leninvaros, of a polypropylene plant with an annual output of 40,000 tons, and with a final production capability of 80,000 tons per year. The new unit will be built by the West Germany company Lurgi, which will use the manufacturing technology of the American company Hercules.

Bulgaria

Bulgaria has invented an oil for protecting metal products, which can be applied in equipment construction and in other branches of the metallurgical industry. The oil, which was developed by Prof Dimitrie Sopov of the Organic Chemistry Institute of the Bulgarian Academy of Sciences, and by Inav Hristov of the Joint Enterprises VI-IZ, creates a thin protection layer at normal temperatures, which protects ferrous and non-ferrous metals against corrosion in humid and corrosive atmospheres.

Poland

The Polish Chemical Industry has given the mining industry a number of exceptionally useful products. Foremost among these are the emulsified, non-flammable, concentrated oils used in hydraulic mining equipment. Polish mines use about 10,000 tons per year of these oils, whose fabrication has been improved by researchers in the Institute for Heavy Organic Synthesis at Blachownia Slaska. The same institute has also formulated the preparation of sealing coagulants and antifreezes, which facilitate the transportation and loading of coal during the winter. Other products are those used to purify water containing large amounts of dust. Polish researchers at the institute are presently occupied in eliminating all flammable products which are still used in mines.

The chemical reagent enterprise Poch of Gliwice, produces a special quality of calcium phosphate which improves the operation of gas discharge lamps. The department of studies of the enterprise is conducting research to produce the special chemical reagents used in electronics. For some time already, Poch has been supplying luminescent silica and other chemical products used in the manufacture of luminescent screen tubes. One of the most recent achievements of the Poch specialists is a new process for obtaining very pure zinc sulfate.

At the Stomil Institute for the Rubber Industry, in Warsaw, a new colored elastomer has been developed, which has perfect elasticity in the temperature range of -30 °C and +130 °C.

The new product, based on butadiene methyl acrylic synthetic rubber, has good mechanical properties, and an absolute resistance to atmospheric agents and the action of oils and solvents. In addition to the conventional components, the mixture includes 100 parts rubber, between 50 and 100 parts hydrated silica and zinc white, plasticizing esters, and substances which retard aging.

Yugoslavia

About 80, and as many as 100 million tons of phosphates have been discovered near Bosiljgard in Yugoslavia. The 1976-1980 development plan envisages the exploitation of a phosphate mine at Lisina with a capability of 3.6 million tons of ore per year, which in turn will be transformed into 900,000 tons of concentrates. As a result, the local consumption of phosphate fertilizers will increase every year, with the expectation that 3 million tons of fertilizers based on phosphate will be produced by 1980.

The Yugoslav company Industrijanafte and the American company Dow Chemical will jointly build a petrochemical complex with a value of 750 million US dollars. The new complex which will be built on Krc Island near Rijeka, will include installations with the following capabilities: 150,000 tons of dichlorethylene per year, 200,000 tons of monomer vinyl chloride per year, 500,000 tons of high density polyethylene per year, 700,000 tons of low density polyethylene per year, 200,000 tons of styrene per year, 400,000 tons of ethylene per year, 180,000 tons of propylene per year, 120,000 tons of C₄ fractions per year, 180,000 tons of benzene per year, and 240,000 tons of ethylbenzene per year. The installations will be placed in operation between 1979 and 1982.

Czechoslovakia

During the last two decades, one of the main goals of the Czechoslovakian economy has been the chemicalization of the country. During the 1971-1975 five-year plan, the Czechoslovakian chemical industry developed by more than 55 percent with respect to 1971.

In terms of the raw materials necessary to the petrochemical industry, Czechoslovakia has small oil deposits in the Hodonin region, which yield approximately 200,000 tons per year. Natural gas deposits are also small, and are found near the Austrian border and in the Ostrava region. Natural gas extraction is of the order of 1.5 billion cubic meters per year.

In order to develop its petrochemical industry, Czechoslovakia has and will continue to resort to crude oil importation, its principal supplier being the Soviet Union. In 1976, the crude oil importation will have been

16 million tons, and it is expected that the crude oil imported from the Soviet Union for the entire five-year plan will reach 88 million tons. Until now, approximately 90 percent of all the imported crude oil has come from the Soviet Union. Small amounts of crude oil have also been imported from Iran, Iraq, and Egypt.

In 1968, an agreement was reached with Iran, according to which Czechoslovakia would import 200 million dollars of crude oil, to be paid through the construction in Iran, of a plant for the manufacture of turbines and generators, as well as through the delivery of technical equipment.

Beginning in 1967, Czechoslovakia will receive piped natural gas from the Soviet Union. The volume of imported natural gases has increased from 2.4 billion cubic meters in 1973, to 3.2 billion cubic meters in 1974.

Czechoslovakia has several small refineries, some of which are as much as 50 years old. They are located at Pardubice, Kollin, and Moravska Privoz, and have an annual processing capability of about 2 million tons of crude oil. The first modern refinery integrated in a petrochemical complex was built at Bratislava; its processing capability has increased from 4.3 million tons in 1967 to 8.5 million tons in 1975, and is expected to reach 10 million tons during this five-year plan.

The first pyrolysis installation at the Bratislava site was built with the cooperation of the British company Humphreys-Glasgow, for a production capability of 60,000 tons of ethylene and 35,000 tons of propylene per year. The Snam Progetti company has built an installation for 25,000 tons of ethylene oxide per year, and another for 20,000 tons of ethylene glycol per year. In addition, an installation for phenol acetone was also built at the same site.

Some of the new production capabilities built during the 1971-1975 period were: a pyrolysis installation with a production of 200,000 tons/year ethylene and 95,000-100,000 tons/year propylene, constructed with the cooperation of Toyo-Engineering and Mitsui Co., and of the West German company Lummus; a polypropylene installation with a production capability of 80,000 tons/year, which was also built with the collaboration of Japanese companies; as well as a high pressure polyethylene installation with a production capability of 40,000 tons/year, which uses the ICI process and which was built with the cooperation of the British company Simon Carves. In 1978, an 80,000 ton/year polypropylene installation will be placed in operation, based on technology bought from the French company Ethylene-Plastique. In Northern Bohemia, at Zaluži, there is an old industrial site which in 1945 produced gasoline through the hydrogenation of brown coal. At the end of the sixth decade, there was built the largest ammonia plant in Czechoslovakia, followed by installations for methanol, phenol, cresol, toluene, xylene, propane, and butane.

By the middle of the seventh decade, synthetic ethanol began to be manufactured at Zaluži, followed by the ethylbenzene required by a synthetic rubber plant which was built at Kralupy. At the beginning of the eighth decade, the entire industrial site at Kralupy was shifted from brown coal to crude oil. The first refinery had a processing capability of 4 million tons/year, which is currently being expanded to 5 million. In 1972, an intermediate pressure polyethylene installation was built with the cooperation of the British company John Brown, which uses the Union Carbide process to produce 80,000 tons/year. The Zaluži industrial site is currently the largest producer of ethylene, polyethylene, and propylene in Czechoslovakia.

In 1971, an agreement was reached between the Zaluži Petrochemical Combine and its counterpart in Böhlen, East Germany, according to which the Böhlen Combine would deliver by pipeline to Zaluži 300,000 tons/year ethylene and propylene, and receive intermediate pressure polyethylene and polypropylene in return. In the future, it is planned that a new pyrolysis installation will be built jointly at Zaluži, with a production capability of 450,000 tons of ethylene per year, which will be processed at Böhlen. A contract for this construction was signed in October 1975 with the Austrian company Voest, the process to be used being the one offered by Lummus. The installation will be in operation in 1979.

Also under construction, is an installation for the hydrogenation of pyrolysis gasoline, and a pyrotol installation which use the Houdry process. As the processing capacity of the Bratislava refinery increased to 10,000 tons per year, and that of the Zaluži refinery to 5 million tons per year, the third synthetic rubber plant was built in 1975 at Kralupy, which simultaneously produces butadiene, styrene, polystyrene, and ABS polymers.

During the current five-year plan, a new refinery with a processing capability of 3 million tons is being built at Ostrova, which will have an annual production of 90,000 tons of propane-butane, 410,000 tons of automotive gasoline, 340,000 tons of light gasoline, 1.5 million tons of heavy fuel, and 7000 tons of sulfur. The plans for 1978-1984 include the construction of a thermoelectric plant with an installed power of 500 MW, which will be fueled by the heavy fractions and residual gases of the refinery.

Together with the development of crude oil processing capabilities, there has been a development of installations for manufacturing plastic materials at both Bratislava and Zaluži. Vinyl polychloride is being manufactured in two large plants, at Novaky in Slovakia, and at Neratovice. The first of these plants has an installation of 25,000 tons/year acetylene and ethylene, using the Hoechst high temperature pyrolysis process, two installations for vinyl chloride of 50,000 tons/year each, one of which uses the Hoechst Goodrich process, and an installation for polyvinyl chloride of 100,000 tons/year.

The Spolana plant of Neratovice also has a vinyl polychloride installation of 100,000 tons/year, which was built by the KHD company. This installation was started in 1975.

During this five-year plan, Czechoslovakia's production of plastic materials will increase as follows:

Vinyl polychloride and copolymers, from 138,000 tons/year in 1975 to 190,000 tons/year in 1980;

High pressure polyethylene, from 52,000 tons/year in 1975 to 150,000 tons/year in 1980, and intermediate pressure polyethylene from 60,000 tons/year to 100,000 tons/year during the same period;

Polypropylene from 78,000 tons/year in 1975 to 110,000 tons/year in 1980, and polystyrene and styrene copolymers, from 51,000 tons/year to 80,000 tons/year during the same period;

Alkylic resins, polyesters, and epoxies, from 71,000 tons/year in 1975 to 95,000 tons/year in 1980, and amino and phenoplasts from 113,000 tons/year to 165,000 tons/year during the same period.

While the 1976 growth of the chemical industry is expected to be 9.1 percent, the production of plastic materials will increase by 42 percent, that of intermediate pressure polyethylene by 300 percent, that of high pressure polyethylene by 81 percent, and that of polypropylene by 57 percent.

In 1975, the production of synthetic and artificial fibers was 140,000 tons, less than 50 percent of which were synthetic fibers. In 1980, it is expected that the total production of synthetic fibers will reach 110,000 tons/year, of which 45,000 tons will be polyester fibers, 40,000 tons will be polyamide fibers, and 25,000 tons will be polypropylene fibers.

In 1975, the production of phosphate fertilizers reached 425,000 tons/year of P_2O_5 , which is very close to the estimated need of 427,000 tons/year. Also in 1975, the production of nitrogen fertilizers reached 446,000 tons/year N, as compared to an estimated need of 522,000 tons/year. The latter is obtained principally at Salo, and the production of phosphate fertilizers at Bratislava, where a complex fertilizer installation was started last year, with a capability of 300,000 tons/year.

As part of the collaboration agreement signed by the West German company Salzgitter and the Soviet foreign trade enterprise Technia Shimport, a plant which will produce ethylene oxide and glycol will be built in the Soviet Union near Gorki. The value of the contract is 200 million DM, and the plant will be placed in operation in 1979.

In Poland, at Wloclowek, on the basis of a contract signed with Polimex-Cekop, the Petrocarbon company is building a key complex for the annual production of 200,000 tons of vinyl polychloride, as well as of significant amounts of caustic soda and various solvents. Operation will begin in September 1979.

In order to complete this large combine, the London bank Lloyds Bank is lending to the Polish Bank Handlowy 125 million of pounds sterling.

In Poland, at the Police combine, the seventh sulfuric acid installation is being built, with an annual capability of 500,000 tons. At the same site, about 1.3 million tons of sulfuric acid were produced in 1975.

The first plant located at the site was started in 1969, and has a capability of 200,000 tons/year. The sulfuric acid is used mainly in the fabrication of fertilizers, and the rest is exported.

At the end of this year, part of the sulfuric acid manufactured here will be used in the fabrication of titanium dioxide, in an installation which is under construction and which costs 2,500 million zlotys. It will have a capability of 36,000 tons/year.

In Yugoslavia, at Prahovo, construction began on a new complex of the company RTB-BOR, which requires investments amounting to 2.2×10^9 dinars. It will have an annual production of 198,000 tons of phosphoric acid, 200,000 tons of monoammonia phosphate, 450,000 tons of sulfuric acid, and 50,000 tons of sodium tripolyphosphate. The phosphoric acid installation, which will operate according to the single tank process of Rhone-Poulenc, will be built by the Krebs company. Operation is scheduled for the end of 1977.

On the basis of a 15-year contract, Yugoslavia will deliver to Hungary about 100,000 tons/year of monoammonia phosphate between 1978 and 1992, and the same amount of triple superphosphate.

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HUNGARY

ROSTER OF NEW DOCTORS AND CANDIDATES OF SCIENCES

Budapest MAGYAR TUDOMANY in Hungarian No 10, 76 pp 652-654

[News from the Committee of Scientific Qualification: New Doctors and Candidates of Sciences, June 1976]

[Text] I. The Committee of Scientific Qualification declared

Miklos Ban, doctor of chemical sciences, on the basis of his dissertation entitled "Theory of Low-Symmetry and Distorted Ligand Fields"; the opponents were: Rezso Gaspar, academician, Ede Kapuy, Dr of physical sciences, and Ferenc Torok, Dr of chemical sciences;

Sandor Endrenyi, doctor of technical sciences, on the basis of his work covered by theses; the opponents were: Tibor Blickle, doctor of chemical sciences, Andras Levi, academician, and Laszlo Forgo, doctor of technical sciences;

Ferenc Gecseg, doctor of mathematical sciences, on the basis of his dissertation entitled "Compositions of Abstract Automata"; the opponents were: Tamas Schmidt, doctor of mathematical sciences, Gabor Szasz, doctor of mathematical sciences, and Jeno Szep, doctor of mathematical sciences;

Laszlo Guczi, doctor of chemical sciences, on the basis of his dissertation entitled "Catalytic Reactions of Saturated Hydrocarbons on Nickel and Platinum Catalysts"; the opponents were: Ferenc Nagy, academician, Pal Fejes, doctor of chemical sciences, and Peter Huhn, doctor of chemical sciences;

Gyorgy Horanyi, doctor of chemical sciences, on the basis of his dissertation entitled "Studies in the Field of Electrosorption and Electrocatalysis"; the opponents were: Erno Pungor, academician, Jozsef Devay, doctor of chemical sciences, and Lajos Gyorgy Nagy, doctor of chemical sciences;

Tibor Huszar, doctor of sociological sciences, on the basis of his dissertation entitled "Changing Functions of the Intelligentsia and the Structure of Society"; the opponents were: Kalman Kulcsar, academician, Istvan Hahn, doctor of historical sciences, and Jozsef Lukacs, academician;

Laszlo Kapolyi, doctor of technical sciences, on the basis of his dissertation defended in the Soviet Union, entitled "Studies of the Complex Mineral Resource Management Based on the System Function"; the opponents were: A. S. Astrakhov, doctor of economic sciences, N. I. Yerebin, doctor of chemical sciences, and I. P. Krapchin, doctor of economic sciences;

Tibor Kelen, doctor of chemical sciences, on the basis of his dissertation entitled "Thermal Degradation of Poly(Vinyl Chloride)" the opponents were: Ferenc Marta, academician, Gyula Hardy, academician, and Tamas Szekely, doctor of chemical sciences;

Sandor Kote, doctor of educational sciences, on the basis of his dissertation entitled "Development of the Socialist Worker School 1917-1920"; the opponents were: Eva Foldes, doctor of educational sciences, Sandor Nagy, doctor of educational sciences, and Jozsef Szarka, doctor of educational sciences;

Lajos Nagy, doctor of economic sciences, on the basis of his dissertation entitled "Productivity, Personal Incomes, and Their Relationships in Agriculture"; the opponents were: Erno Csizmadia, academician, Aladar Sipos, academician, and Bela Fazekas, candidate of economic sciences;

Gabor Reichardt, doctor of agricultural sciences, on the basis of his dissertation entitled "Investigation of the Spring Aspects of Moth-Fly Colonies on Hungarian Fruit Species"; the opponents were: Laszlo Banki, doctor of agricultural sciences, G. Adolf Mamminger, doctor of agricultural sciences, and Ferenc Gyuro, candidate of agricultural sciences;

Pal Rokusfalvy, doctor of psychological sciences, on the basis of his dissertation entitled "Regulatory Concept of Sports Activity"; the opponents were: Lajos Bartha, doctor of psychological sciences, Ferenc Lenard, doctor of psychological sciences, and Laszlo Kelemen, doctor of psychological sciences;

Karoly Sarkadi, doctor of mathematical sciences, on the basis of his dissertation entitled "Normality Studies"; the opponents were: Karoly Tandori, academician, Bela Gyires, doctor of mathematical sciences, and Pal Revesz, doctor of mathematical sciences;

Ferenc Schipp, doctor of mathematical sciences, on the basis of his dissertation entitled "Investigation of Series Developments According to Product Systems. Didactic Analysis"; the opponents were: Karoly Tandori, academician, Laszlo Leindler, academician, and Lozsef Mogyorodi, candidate of mathematical sciences;

Kalman Szalai, doctor of technical sciences, on the basis of his dissertation entitled "New Theory of the Calculation of Compressed-Bent Reinforced Concrete Bars"; the opponents were: Tibor Gyengo, doctor of technical sciences, Laszlo Palotas, doctor of technical sciences, and Peter Lenkei, candidate of technical sciences;

Peter Szoke, doctor of biological sciences, on the basis of his dissertation entitled "Sound Microscopy"; the opponents were: Endre Garastyan, doctor of medical sciences, Lajos Kardos, doctor of psychological sciences, and Tamas Tarnoczy, doctor of physical sciences; and

Geza Tassi, doctor of technical sciences, on the basis of his dissertation entitled "Stress and Deformation States of Stressed Reinforced Concrete Beams"; the opponents were: Laszlo Palotas, doctor of technical sciences, Tamas Frey, doctor of mathematical sciences, and Jozsef Peredy, candidate of technical sciences.

II. The Committee of Scientific Qualification declared

Miklos Ajtai, candidate of mathematical sciences, on the basis of his dissertation entitled "Definable Banach Spaces";

Janos Aranyosi, candidate of medical sciences, on the basis of his dissertation entitled "Anesthesiological Ramifications of Serum Cholesterase Activity";

Pham Vu Anh, candidate of geographic (meteorological) sciences, on the basis of his dissertation entitled "New Method for the Determination of the Displacement Speed of Atmospheric Fronts";

Erno Bacsy, candidate of medical sciences, on the basis of his dissertation entitled "Variations in the Enzyme Content of Lysosomes. Light- and electron-microscopical Histochemical Studies";

Imre Balazsi, candidate of medical sciences, on the basis of his dissertation entitled "Glucose Metabolism and Insulin Uptake of Isolated Human Adipose Cells";

Gyula Baradnay, candidate of medical sciences, on the basis of his dissertation entitled "Steroid and Sex-Chromatin Studies on Urine in Cases of Breast Cancer in Females";

Truong Van Bay, candidate of biological sciences, on the basis of his dissertation entitled "Physiological and Pharmacological Studies on the Rhythmic Operation of Neurons in *Helix pomatia* L.";

Endre Bojtár, candidate of literary sciences, on the basis of his dissertation entitled "Slavic Structuralism in Literary Sciences";

Pal Bruszt, candidate of medical sciences, on the basis of theses summing up his scientific work over several decades;

Iren Szatkoczy (Mrs Csukas), candidate of biological sciences, on the basis of her dissertation entitled "Investigation of the Regulation of Melaminic Acid in *Drosophila melanogaster*";

Gyorgy Deak, candidate of medical sciences, on the basis of his dissertation entitled "Comparative Contrast Study of the Posterior Skull Cavity";

Gyula Deak, candidate of chemical sciences, on the basis of his dissertation entitled "Obtaining 1,3-butadiene from C₄ Hydrocarbon Fractions by Means of Extractive Distillation";

Gabor Druzbaczky, candidate of chemical sciences, on the basis of his dissertation entitled "Study of the Manufacture of Bicomponent Filaments Based on Polypropylene";

Mohamed Nazeeh Abd-Elhal Sharaf-Eldin, candidate of agricultural sciences, on the basis of his dissertation entitled "Problems of Recreation, Guidelines for Designing Recreational Areas, Recreational Settlements, and Greenery, With Special Emphasis on Egypt";

Addalla Ghonemy Eraky, candidate of agricultural sciences, on the basis of his dissertation entitled "Biometric Analysis of the Relationship Between Synthetic Fertilizer Effect and Wheat Yield";

Erzsebet Feher, candidate of medical sciences, on the basis of her dissertation entitled "Structure and Function of the Neural Elements of the Small Intestine";

Bela Fodor, candidate of agricultural sciences, on the basis of his dissertation entitled "Modern Production Technology of Flower Bulbs and Seedlings";

Geza Fodor, candidate of philosophical sciences, on the basis of his dissertation entitled "The World Image of the Mozart Opera";

Istvan Fodor, candidate of geographical sciences, on the basis of his dissertation entitled "Climatological and Bioclimatological Features of the Major Types of Caves";

Mrs Bela Gadanecz, candidate of historical sciences, on the basis of her dissertation entitled "History of the Trade Union of Hostelry Workers From the Very Beginning to 1919";

Bela Galfy, candidate of medical sciences, on the basis of his dissertation entitled "Rehabilitation of Chronic Schizophrenics With the Help of Pharmacotherapy and Sociotherapy";

Laszlo Garami, candidate of sociological sciences, on the basis of his dissertation entitled "The Village Intelligentsia as a Culture-Transmitting Medium and the Conditions Under Which This Function Can Be Carried Out";

Margit Vinkler (Mrs Harkay), candidate of chemical sciences, on the basis of her dissertation entitled "Carotinoidic Colorants in Spice Paprika; a Study of Their Changes";

Sandor Hernadi, candidate of chemical sciences, on the basis of his dissertation entitled "Effect of the Aging of Cellulose and Paper on Physical and Chemical Parameters";

Sandor Herodek, candidate of biological sciences, on the basis of his dissertation entitled "Investigation of the Composition and Formation of Animal Reserve Fats";

Laszlo Honti, candidate of linguistic sciences, on the basis of his dissertation entitled "History of the Obi-Ugric Vocalism";

Jozsef Horvath, candidate of agricultural sciences, on the basis of his dissertation entitled "Investigation of the Major Technical Parameters of Four-Wheel-Drive Tractors Under Conditions Prevailing in the Hungarian People's Republic";

Bela Karvaly, candidate of biological sciences, on the basis of his dissertation entitled "Studies on Artificial Biomolecular Lipid Membranes, With Special Emphasis on the Mechanism of Electron Conduction";

Nguyen Cao Khuong, candidate of technical sciences, on the basis of his dissertation entitled "Calculation of the Optimum Reserve of an Energy System and Its Distribution on the Basis of the Reliability Theory";

Laszlo Kovacs, candidate of medical sciences, on the basis of his dissertation entitled "Histological Study of Organ Damages Caused by Experimental Fractionated Local X-ray Irradiation";

Zoltan Kovacs, candidate of medical sciences, on the basis of his dissertation entitled "Use of Computer-Technological and Biometric Procedures in Pediatric Medicine";

Bela Kozeki, candidate of psychological sciences, on the basis of his dissertation entitled "Pedagogical and Psychological Study of Motivation and Motivational Relations";

Agnes Kurcz, candidate of historical sciences, on the basis of her dissertation entitled "Cavalry Culture Matters in Hungary (12-14th Centuries)";

Dang Huu Lanh, candidate of biological sciences, on the basis of his dissertation entitled "Investigation of the Heterogeneity of the Alpha Chain of Hemoglobin by Means of Immunological Methods";

Erno Matyas, candidate of earth sciences, on the basis of his dissertation entitled "Geological and Mineralogical Conditions of the Non-Ore Mineral Resources of the Tokaj Mountain Region";

Laszlo Modis, candidate of medical sciences, on the basis of his dissertation entitled "Topo-Optical Study of Mucopolysaccharides (Acidic Glycosaminoglycans)";

Janos Monigl, candidate of technical sciences, on the basis of his dissertation entitled "Analytical Method for the Determination of the National Public Road Network Requirements";

Zsuzsanna Mora, candidate of biological sciences, on the basis of her dissertation entitled "Investigation of the Active Center of Pancreas Amylase";

Laszlo Morva, candidate of medical sciences, on the basis of his dissertation entitled "Some Public Health Problems of Modern Large-Scale Agricultural Production Establishments";

Miklos Muller, candidate of technical sciences, on the basis of his dissertation entitled "Static Analysis of the Twin-Tunnel Cross Section of the Typical Budapest Subway Station";

Vo Hong Ngy, candidate of biological sciences, on the basis of his dissertation entitled "Chemotaxonomical Study of the Configuration of Hungarian *Solanum dulcamara* L.";

Miklos Revay, candidate of chemical sciences, on the basis of his dissertation entitled "Investigation of the Theoretical Fundamentals of Strength Changes Encountered in Aluminate Cements";

Laszlo Sagi, candidate of veterinary medical sciences, on the basis of his dissertation entitled "Hip-Joint Dysplasia in German Shepherd";

Endre Selenyi, candidate of technical sciences, on the basis of his dissertation entitled "Digital Compensation of Alternating-Current Test Circuits";

Alfred Simonyi, candidate of technical sciences, on the basis of his dissertation entitled "Investigation of the Transverse Oscillations of Four-Axle, Rotating-Truck Railway Carriages With Stochastic Excitation";

Mrs Erno Stenszky, candidate of biological sciences, on the basis of her dissertation entitled "Investigation of the Relationships Between HL-A Antigens and Certain Diseases";

Antal Szabo, candidate of chemical sciences, on the basis of his dissertation entitled "Steroid Chromogens";

Elek Szabo, candidate of medical sciences, on the basis of his dissertation entitled "Investigation of Factors Affecting the Voiding of the Pregnant Human Uterus";

Tran Quy Tien, candidate of mathematical sciences, on the basis of his dissertation entitled "Investigations in the Field of Rees-Type Matrix Semigroups and Rees-Type Matrix Rings";

Dang Huy Uyen, candidate of physical sciences, on the basis of his dissertation entitled "Investigation of the Structure of ^{45}Sc and ^{55}Mn Nuclei"; and

Janos Varga, candidate of veterinary medical sciences, on the basis of his dissertation entitled "Serological Study of *Escherichia coli* Isolated From Calves and Pigs, and Vaccination Tests to Prevent *E. coli* Induced Diarrhea."

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HUNGARY

BIOGRAPHIC SKETCHES OF NEW CORRESPONDING ACADEMICIANS

Budapest MAGYAR TUDOMANY in Hungarian No 10, 76 pp 622-633

[Unattributed article: "New Corresponding Members of the Hungarian Academy of Sciences"]

[Excerpts] Rudolf Czelnai was born in 1932 in Miskolc. He obtained a degree at Eotvos Lorand University of Sciences in 1954, and he defended his dissertation entitled "On the Accuracy of Territorial Averages Calculated on the Basis of Test Points" in 1972. On the basis of his dissertation, he was awarded the title of doctor of earth (meteorological) sciences. At the present time, he is the chairman of the National Meteorological Service. His field of study is the statistical modeling of meteorological processes and fields, designing of observational networks, and the economic aspects of meteorological services. The following are his most important publications to date: "On the Statistical Structure of Meteorological Fields"; GERL. BEITR. Z. GEOPH., 1975, Vol 2 (Leipzig, 1966) [in English]; "Proposal for the Distribution of New Rainfall Stations, Hydrometeorological Survey, Lakes Victoria, Kyoga, and Albert, Entebbe, 1968 [in English]; "Confidence Levels of Monthly Regional Precipitation Averages Calculated on the Basis of Test Points, OMSZ [Hungarian Meteorological Service], 1972; "Statistical Structure of Meteorological Fields (co-edited with L. S. Gandin, Leningrad, and V. Zahariev, Sofia), OMSZ XII, Budapest, 1976 [in Russian].

Katalin Szikra (Mrs Falus) was born in 1924 in Moscow. She studied in Hungarian schools. In 1951, she obtained a degree at Charles Marx University of Economic Sciences. In 1970, she was awarded the title of doctor of economic sciences. In her dissertation, she dealt with the role of staff size and productivity in the economic growth of socialist countries. At the present time, she is professor at Charles Marx University of Economic Sciences. Her studies are in the field of socialist political economics, specifically aspects of productivity, distribution, and wages. Her major publications so far are the following: "Technical Development and Industrial Work" Kossuth, 1961; "Staff Size and Productivity — Economic Growth" Kossuth, 1968; "Productivity and Motivation" Kossuth, 1975.

Pal Jakus was born in Sarkad in 1928. He obtained a degree at the University of Sciences in Debrecen; today, he is department head and professor at this university (Department of Botany). On the basis of his dissertation entitled "Synecological, Phytocenological, and Structural Studies of the Dynamic Relationships of Forests and Meadows" he was awarded the title doctor of biological sciences. At the present time he carries out research in the fields of phytocenology, synecology, and environmental biology. His major publications are: "The Phytocenological Relationships in the Oak Forests of Southeast-Central Europe" Academic Press, Budapest, 1961 [in German]; "Dynamic Relationships Between Forests and Meadows" Academic Press, Budapest, 1972 [in German]; "New Classification of Forests and Zerotherm Meadows on the Cenologic Basis (*Quercetea pubescenti-petreae* n. cl.) in Europe, 1960 [in French]; "Complex Vegetation Mapping With the Practical Forestry" 1965 [in English]; Sikfokut Project: Environmental-Biological Study of an Oak Ecosystem Within the Biosphere Program" 1973.

Tamas Keleti was born in 1927 in Budapest. He obtained a chemical degree in 1948 at Eotvos Lorand University of Sciences. At the present time, he is deputy director of the Enzymological Section at the Szeged Biological Center, Institute of Biochemistry. He carries out research in the field of enzymology, where he is interested in enzyme kinetics, molecular-level regulation, and the thermodynamics of enzymatic action. He carries out experiments on the active center of dehydrogenases and the effect mechanisms involved. On the basis of his dissertation dealing with these matters, he was awarded the title doctor of biological sciences. His major publications so far: "The Liberator" J. THEOR. BIOL., Vol 16, 1967 [in English]; "Effect of Steric Changes in the Protein on the Kinetics of Enzymic Reactions" ACTA BIOCHEM. BIOPHYS. HUNG., Vol 3, 1968 [in English]; "The System of Double Inhibitions" (co-authored with Fajzsei), MATH. BIOSCI., Vol 12, 1971 [in English]; "Functional Non-Identity of Subunits and Isolation of Active Dimers of Glyceraldehyde-3-Phosphate Dehydrogenase" (co-authored with Ovadi, Telegdi, and Batke). EUR. J. BIOCHEM., Vol 22, 1971 [in English]; "Catalysts and Enzymes. Thermodynamic and Kinetic Basis of Enzyme Regulation" (co-authored with Ovadi and Batke), J. MOL. CATAL., Vol 1, 1976 [in English]; Fundamentals of Enzyme Kinetics, Textbook Publishers, Budapest, 1976.

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POLISH ACADEMY OF SCIENCES ACTIVITIES, PERSONNEL

Warsaw NAUKA POLSKA in Polish No 8, Aug 1976 pp 108-122

[Excerpts] Scientific Activities

Food Microbiology

On 9-10 April 1976 an All-Polish Scientific Conference on Modern Trends and Research Methods of Food Microbiology was held in Szczecin. Outstanding specialists from all University Centers of Poland and representatives of branch institutes and ministries concerned participated in its debates presided over by Prof Zbigniew Lorkiewicz, Chairman of the Committee of Microbiology of the PAN [Polish Academy of Sciences].

The Conference served as a prelude to the 10th Jubilee International Symposium of the Committee of Microbiology and Hygiene of the International Association of Microbiological Societies (IAMS) planned to be held in September 1977.

Organo-Silicon Compounds

The Fourth All-Polish Symposium entitled "Organo-Silicon Compounds," organized by the Center of Molecular and Macromolecular Research of PAN in Lodz and the Institute of Polymers of Lodz Polytechnic was held on 26-27 January in Lodz. The aim of the Symposium was to more closely acquaint its participants with the current research work in the field of organic compounds of silicon carried on by the units of higher educational institutions of the Polish Academy of Sciences and industry, as well as to effect a mutual exchange of experience and to establish closer cooperation between these units.

About 80 specialists from the field of the chemistry and technology of organo-silicon compounds took part in the Symposium which was inaugurated by Academician of PAN Jan Michalski. About 50 reports and communications were delivered in which there were presented results of fundamental research and of purely applied investigations relating to low- and high-molecular

organo-silicon compounds and to esters of silicic acid. Discussion was devoted to the cooperation between research units in the domain of the solution of problems relating to the chemistry and technology of silicones of importance to the national economy. It was also emphasized that organo-silicon compounds of practical importance, especially polymers known as silicones, have found widespread use in many fields. Silicones and silicic esters are used by industries beginning with the cosmetic and ending with the heavy and machine-building industries. They are used in great quantities in construction, transportation, medicine, conservation of monuments, as well as in housekeeping and in everyday life. The research and promotion work in the field of the production of silicones are conducted by the Institute of Industrial Chemistry in cooperation with higher educational institutions and Polish Academy of Sciences, where the main stress is on the basic work. The existing cooperation has yielded useful effects, among other things the elaboration of the new technologies, new analytical methods and new methods of the synthesis of auxiliary agents.

In the course of the symposium the projects of the new plans of this cooperation were analyzed and the recent results of basic Polish research in the field of organo-silicon compounds were reviewed.

The CETI Conference Held in Katowice

The Silesian Branch of the Voivodeship Polish Astronautical Society and Polish Physical Society - Silesian University Branch - organized on 10 March 1976 in Katowice a CETI Conference on the subject "Possibilities of the Occurrence of Life and Technical Civilizations Beyond the Earth and Making Contact With Them."

The CETI abbreviation stems from the English name of the international program of the search for extraterrestrial civilizations (Communication With Extraterrestrial Intelligence). The main implementers of the CETI program are the Soviet and American scientists.

The inaugural report entitled the "CETI - Past, Present and Future of Investigations" was delivered by Prof Rudolf Pesek from the Czechoslovak Academy of Sciences, one of the initiators of the CETI program and chairman of the Committee for Contact With Extraterrestrial Civilizations of the International Academy of Astronautics for the past 5 years. From among Polish scientists reports were delivered by Prof Mieczyslaw Subotowicz and Docent Dr Zdzislaw Ilczuk from UMCS [Marie Curie-Sklodowska University] in Lublin, and Dr Engr Olgierd Wolczek of Warsaw.

The Conference of Physicists "EKON-7"

The Conference of "EKON-7" devoted to problems of quantum electronics and nonlinear optics was held on 26-29 April 1976 in Poznan. Over 300 specialists from Poland and from Bulgaria, Czechoslovakia, GDR, and USSR participated.

The proceedings were focused on many problems connected with practical utilization in science, economy and technology of the achievements in this field of science which recently made great advances.

The "SALMED-76" Conference

The international Conference organized by NOT [Chief Technical Organization] on the subject "Science and Technology in the Protection of the Health and Life of Man" was held on 12-13 April 1976 in Poznan. It formed an integral part of the International Medical Exhibition "SALMED-76" which was opened simultaneously for the first time in Poland at which the latest achievements of the world medical technology were exhibited.

During the Conference it was stressed in discussions that the development of medicine in the field of prophylaxis, diagnosis and therapy, as well as in the field of scientific theoretical foundations, depends to a decisive degree on technological progress. In Poland the paramount role in this matter is played by the Institute of Biocybernetics and Biomedical Engineering of PAN. One of the fundamental directions of the work of the Institute are investigations in the field of transplantology--the science engaged in transplantation of organs. The greatest achievement--both in Poland in in the world--has been made in the transplantation of kidneys.

International Conference of Information Scientists

The Polish Academy of Sciences, the Ministry of Science, Higher Education and Technology, and the Chief Technical Organization, with cooperation and under the auspices of the International Federation of Information Processing (IFIP) and the Commission of Multilateral Cooperation of the Academies of Sciences of Socialist Countries, organized, on 22-27 March 1976 in Warsaw, the International Conference of Information Processing "INFOPOL-76." About 500 scientists, including about 300 from Poland took part in it.

The subject matter of the proceedings was focused on the key problems of the development of information science in Poland. It was the subject of 40 reports delivered by outstanding specialists who discussed among other things the present state of science and the latest trends in the development of information science in the world. Many problems, as for example computerization of management systems, the control of production processes, the use of computers in designing, trends of the development of computer techniques and methods of the production of programming are closely connected with plans of the development of Polish information science in the near future.

The Conference made it possible for Polish specialists to compare their own views concerning specific uses of information science with the opinions of the prominent foreign specialists and to obtain new intelligence enriching

their knowledge in this field. Moreover, the participants in the Conference will be instrumental in generalizing the results of the Conference in the specialized media abroad.

Research-related Achievements

Diagnostic Medical Equipment Produced by Experimental Laboratory "TEHPAN"

The Experimental Laboratory of the Institute of Fundamental Problems of Technology of PAN (IPPT PAN)--"TEHPAN"--utilizing the results of the research work carried on at the Ultrasound Laboratory of the IPPT PAN has recently scored technological successes, among other things in the field of diagnostic medical electronic equipment. Within a short period of time the following apparatuses were elaborated and their small-scale production was started: the ultrasonic pulse detector of standard and miniaturized varieties, an ultrasonocardiograph permitting examinations of the heart at any level, ultrasonographs to permit visualization of organs of the abdominal cavity, the ultrasonic localizer of placenta, a cardioscope to serve as a bedside monitor with an alarm attachment, ultrasonic flow meters of blood in organism and in extracorporeal systems, an analyzer of profiles of the blood flow rate.

The opinion of the clinics that are using the "TEHPAN" equipment unequivocally confirmed the technical qualities of the equipment, its diagnostic usefulness, and the low levels of power ensuring complete harmlessness for a living organism. The achievements in the field of diagnostic equipment received even broader appraisal than just domestically - for example, the ultrasonic detector of the fetal pulse was awarded a special certificate at the Exhibition of "Zdravookhraneniye" [Public Health] in Moscow.

This apparatus, developed by the Experimental Laboratory "TEHPAN", won the contest against strong international competition, in particular because of the low levels of power applied in the detector, which ensures the complete harmlessness of the diagnostic method for such a delicate organism as the fetus in the early period of pregnancy.

These apparatuses are being manufactured based on the latest and most valuable Polish technological achievements in the field of electronic materials and devices. The present phase of development is the transition to a technique of integrated structures and modern laminar assembly. The new types of "TEHPAN" apparatuses are manufactured with use of technology that ensures the possibility of introducing large-scale production as the demand increases. Within the framework of international specialization of the CEMA countries the Institute of Fundamental Problems of Technology and the "TEHPAN" are the leading units in the domain of the medical diagnostic ultrasonic equipment. In 1975 the Institute and the "TEHPAN" were awarded

certificates of the Coordination Center of CEMA for Matters of the Development of Medical Equipment for their active part played in the scientific and technological integration of the CEMA countries in the field of the development of medical equipment.

Equipment for Investigation of Bursts and Shocks in Mines

At the Institute of Geophysics of PAN (a team under the direction of Engr Włodzimierz Romaniuk, M.A.) a set of devices has been developed for an automatic seismological recording making possible a continuous follow-up, and as a consequence the prevention, among other things of the effects of such phenomena as the bursts and shocks which are the cause of serious accidents in mines.

The set, named "Gornik" [Miner], is a modern technical apparatus ensuring high reliability of recording, while it is 3 to 4 times cheaper than similar equipment imported from abroad. Since these phenomena occur with great intensity in the Upper Silesian Coal Basin and in the Lubin Copper Field this achievement is of particular importance for the national economy and the safety of the people working underground.

In mining the deposits, especially in the areas of a complex tectonic structure, very often bursts and shocks occur that constitute an enormous danger for the mining crews and mines. The Gornik automatic seismological recording set, developed by the Institute of Geophysics of PAN, is a modern technological breakthrough intended for continuous follow-up of seismological phenomena in mines adapted to spectral characterization of the occurring bursts.

The system of recording--modulation of the pulse duration--permits a six-channel recording on one magnetic track along with the time code, whereas the system of magnetic memory makes possible a continuous follow-up of phenomena and the storage of information alone on the magnetic tape. The system may be adapted to a numerical analysis. At the same time the recordings of bursts are parallelly transcribed on the automatically actuated visual recorder.

The apparatus ensures a high reliability of the recording and makes possible a modular extension of the station and the recording of phenomena at any workplace, even in gassy mines. The prototype of this apparatus (its first version), which has been working successfully for some years in the mine of "Miechowice", was awarded the Order of the Banner of Labor First Class for achievements in the safety of work and protection of crews against accidents, to which the apparatus in question has contributed a great deal.

The work on the improvement of the method and devices aimed at the control of the hazards in mines continues and the new improved and more reliable designs will be developed in the Experimental Laboratory of the Institute of Geophysics of PAN - "GEOPAN".

The interest of these devices both on the part of the Department of Mining and Energy and on the part of individual mines is very great.

Optical Typewritten Text Reader CTM-02

In the Laboratory of the Informatization [Computerization] of the Processes of Document Processing of the IOK [Institute of Organization and Control] of PAN and MNSzWIT [Ministry of Science, Higher Education and Technology] (a team of specialists under the direction of engineers Marek Decowski and Ryszard Dulewicz) an optical reader of typewritten texts was developed and designed. This modern device permits a considerable shortening of the production cycle of publishing work in printing plants through the use in practice of the photocomposition technique, which eliminates among other things a very difficult, arduous and harmful type of work for printing workers and considerably enhances the publishing efficiency and improves the quality of production. In this method the text readers are sui generis suppliers of an enormous amount of textual information.

The CTM-02 reader, using about 95 percent domestic parts, technologies, and subassemblies, was installed in the Printing Plants of "Dom Słowa Polskiego" [House of Polish Literature] in the framework of the photocomposition system Linotron 505 TC and in the course of experimental trials withstood tests satisfactorily. This device--unique in Poland as well as in the CEMA countries--is an original Polish accomplishment, protected by many Polish and foreign patents.

Text readers are devices that recognize letters, numbers and other characters. They code and record, simultaneously, on the punched tape, magnetic tape, and on disks, the necessary data, and even transmit them directly to machines that work in the computing systems.

The optical reader of typewritten texts CTM-02, developed in Poland, whose final project and prototype were developed within a year, recognizes individual characters of the text (letters, numbers and other characters) and codes these characters on a paper tape. The speed of the reading: maximal - 200 characters per second, effective - 360,000 characters per hour. It is characterized by an extreme automation of all readouts and recognition of characters, as well as the possibility of reading Polish, English and German texts, along with a great accuracy (a small number of errors in the transmitted text and a well developed proofreading system).

Thanks to the use of CTM-02 reader a considerable shortening of the publishing cycle has been achieved, with the elimination of a very labor-consuming stage of coding and a considerable decrease of human work, which brings about great financial savings. For example, the reader replaces 40 key tape punchers.

Taking into account the possibility of starting a small-series production of readers in Poland a maximal effort was made to base their design on the already developed Polish production technologies and subassemblies. To this end the cooperation was established with WZE ELWRO [Wroclaw Electronic Plants], as well as with the Institute of Computers and with the Precision Machine Tools Plant AVIA. The Polish version of the OCR-B2 type was elaborated in the Printing Type Center of the OBR [Research and Development Center] of the Printing Industry. The OBR of the Printing Industry and the Printing Plants of the "House of Polish Literature" cooperated in the adaptation of the reader to cooperation with the photocomposition system Linotron 505 TC.

Export Activity of the Institute of Hydrotechnics of PAN in Libya

Since 1973 the Institute of Hydrotechnics of PAN has been engaged in the export of services and technical know-how to the Libyan market. The Institute gave professional advice to the enterprise "Hydrobudowa-4" [Hydroconstruction - 4] during the preparation of an offer for the performance of hydro-technical work on the water intake for the power plant at Bengazi. Then, two expeditions were carried out in Libya in 1974 and 1975 aimed at the ascertainment of the dynamics of sea and coast, during which measurements were performed of the wave motion, currents, and the shore drift. At the same time, the necessary wave parameters for the performance of the designing work were determined by theoretical calculations. It should be noted that the wave parameters determined theoretically by the methods worked out by the Institute of Hydrotechnics of PAN and verified under conditions of the Baltic Sea were fully confirmed during the expedition's measurements in Libya. The next work concerned a determination on the basis of laboratory research of the shape of the water intake and spillway for the cooling cycle of the power plant as well as that of the distance between the water intake and spillway. These works were supervised and accepted by the Belgian and French experts and won a very high appraisal.

During the construction in 1975 the representatives of the Institute of Hydrotechnics of PAN stayed constantly at the construction site and gave current advice concerning dynamics of the sea and sea bottom. Advice was also repeatedly given to the Belgian and Libyan Inspection as well as Polish Foreign Trade Centers "Budimex" [Export-Import Enterprise of Construction and Building Materials Industry] and "Energoexport" [Power Export Enterprise].

In 1975 the IBW [Institute of Hydrotechnics], together with the Design Office "Projmors" [Maritime Construction Plans Office], through the Polish Foreign Trade Center "Polservice", engaged itself in designing a fishery harbor in Bengazi. In autumn 1975 a surveying group carried out the ground work and the necessary office work is likewise being performed. As a next stage, consultations are envisaged between the IBW and the "Projmors" Design Office, during design work, and the supervision of the laboratory tests which are to be performed by the English Company of "British Hovercraft."

Taking advantage of the acquaintance with the market and natural conditions in Libya, the IBW of PAN, through the mediation of the "Polservice", took part in the subsequent competitive tendering relative to the development of harbors. Thanks to a cooperation with "Polservice" the IBW made another competitive bidding for laboratory and ground work in other Arab countries as well.

Physicochemical Methods of Decreasing the Flow of Water in Natural Porous Media

In the Department of Rock Mass Mechanics of PAN in Krakow research is being carried out, among other things, relative to the flow of fluids in porous media and, in particular, of the flow of various aqueous solutions in artificial and natural porous media.

In the Laboratory of Filtration of the Department of Rock Mass Mechanics of PAN in Krakow research is also being carried out concerning the complex of phenomena leading to changes in filtration properties of natural sands, as a result of the interaction of clay minerals with solutions flowing through. Investigations are aimed at finding simple methods of decreasing the flow of water through natural sands.

Almost all natural porous media, and in the first place sedimentary rocks, contain clay minerals. These minerals, due to their peculiar crystalline structure and small size particles, are active when interacting with water and substances contained in it. This activity of clay minerals is the cause of many physicochemical phenomena occurring during the flow of aqueous solutions through natural sands.

In the experiments carried out, the suitably realized flow of inorganic sodium salts decreased the initial flow by several hundred times.

The condition for the realization of such a decrease of the flow is an adequate content of clay minerals (several percent), selection of a proper concentration of sodium salts, and choice of procedure during injection of solution.

The obtained results of investigations may become a basis for the development of a method of decreasing the flow of water in water-bearing sands by means of a properly selected injection of solutions of sodium salts. Such a method of sand consolidation may be used for a decrease of the flow of water to excavations in soil engineering and in mining, and, in particular in surface mining.

Miscellanea

A Course of Mathematical Applications

The Institute of Mathematics of PAN and the Computing Center of PAN have organized a supplementary course on mathematical applications, which lasted from March to May 1976.

The program of the course comprised the following cycles of lectures: The Data Structures in Programming (Dr P. Debinski); Operating Systems (Dr J. Madey); Mathematical Foundations of Programming (Docent Dr habilitatus A. Mazurkiewicz); Differential Methods and Finite Element Methods of the Solution of Differential Equations (Dr A. Wakulica); Modeling and Simulation of Processes in Programming (Dr J. Winkowski); A course of FORTRAN Language (Docent Dr W. Pachelski).

The course was intended for persons using methods of applied mathematics and information science.

Exhibition of Equipment Developed by PAN

On 5-10 April 1976, in the Palace of Culture and Learning in Warsaw, the Exhibition of Scientific Research Equipment Developed and Manufactured the Polish Academy of Sciences was held under the slogan: "Equipment is a Modern Work Tool." The Exhibition was organized by the United Establishments of Scientific Equipment of PAN. Twenty-two departments of the Academy took part in it, including nine experimental plants manufacturing the prototypes of exhibits of the academies of sciences of the USSR, Czechoslovakia, GDR and Hungary were also displayed.

The present exhibition, the third one held, displayed the achievements to-date of the institutions of PAN in the field of manufacture of scientific research devices. The exhibits included, among other things, electronic measuring instruments, laboratory and chemical equipment, microwave and ultrasonic devices, medical, spectroscopic and geophysical equipment, etc.

The exhibition was, on the one hand, a display of the achievements of the Polish Academy of Sciences in the field of the equipment of research workshops and, on the other hand, it constituted an offer inviting industry to undertake at least the production of the equipment whose marketing is already assured.

Scientific Publications

Scientific Activity of the Institute of Fundamental Problems of Technology of the Polish Academy of Sciences in 1974 (PWN, Warsaw, 1975, 115 pp, illus.) is a report on the works performed by the Institute.

These works were focused on problems from the following domains: mechanics, acoustics, selected problems of electrical engineering, theory of electromagnetic field, technical physics. The book acquaints us with principal achievements of scientists of the Institute of Fundamental Problems of Technology and provides information about the results of the activity of various organizational units of the Institute. The last chapter of the report is devoted to a synthetic review of 16 conferences on the mechanics of rigid bodies, sponsored by the Institute.

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